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The Influence of Environmental Concern, Perceived Risk, and Subjective Norm on Purchase Intention of Electric Cars through Attitude

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Abstract

The growing interest in electric cars creates a need to better understand the factors that influence consumers' willingness to purchase them, particularly in highly urbanized areas such as Jabodetabek. This study examines the relationships among environmental concern, perceived risk, subjective norm, and purchase intention, while treating attitude as a mediating variable. The study adopted a quantitative explanatory design and collected data through purposive sampling. The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS. The results show that environmental concern and subjective norm significantly affect consumers' attitude toward electric cars, whereas perceived risk does not significantly affect attitude. Attitude is positively and significantly related to purchase intention. Environmental concern does not directly affect purchase intention, while subjective norm has a positive and significant direct effect. The mediation results indicate that attitude fully mediates the effect of environmental concern on purchase intention and partially mediates the effect of subjective norm on purchase intention. However, no mediating effect of attitude is identified in the relationship between perceived risk and purchase intention. These findings emphasize the role of favorable attitudes and social influence in shaping consumers' intention to purchase electric cars in the Jabodetabek area.

Keywords

Attitude, Electric Vehicle, Environmental Concern, Perceived Risk, Purchase Intention, Subjective Norm.

1. Introduction

The growing impact of climate change and the continued rise in greenhouse gas emissions have encouraged many countries to accelerate the transition to more sustainable transportation systems. Electric Vehicles (EVs) have become a major innovation supporting this transition because they can reduce reliance on fossil fuels and promote low-carbon mobility. However, the widespread adoption of electric vehicles is not determined solely by technological advancements or infrastructure availability. Consumer decisions are also shaped by various economic, environmental, and psychological considerations that influence how individuals evaluate and accept sustainable technologies (Anastasiadou & Gavanas, 2022; Ambarwati et al., 2023). When consumers consider adopting environmentally friendly innovations, their awareness of environmental benefits, willingness to accept new technologies, and perceptions of the advantages and uncertainties associated with EVs become important elements in forming purchase intention (Zamil et al., 2023).

Indonesia's electric vehicle market has grown substantially, driven by technological advances, government initiatives, and supporting infrastructure (PwC, 2024). However, rising sales do not fully explain the psychological processes underlying consumers' decisions. Purchase Intention is therefore important for understanding consumers' willingness to adopt EVs. Their decisions may reflect environmental benefits, technological performance, ownership costs, and social influences. This issue is particularly relevant in Jabodetabek, Indonesia's major economic hub. Naufal et al. (2024) found that EV purchase intention in Jabodetabek is influenced by consumer perceptions and psychological factors, including perceived benefits, uncertainties, and social expectations, by integrating the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). Environmental concern refers to individuals' awareness of environmental issues and consideration of environmental consequences in consumption decisions (Dunlap, 2012; Fang et al., 2025). Consumers with greater environmental awareness may perceive EVs more favorably because they offer a sustainable transportation alternative that can help reduce carbon emissions. Previous studies have highlighted the role of environmental concern in shaping EV attitudes and purchase intentions. Yeğin and Ikram (2022) found that environmental awareness influences consumers' willingness to adopt EVs, while Sudarsih et al. (2026) confirmed that environmental concern significantly contributes to positive attitudes toward EV adoption.

Beyond environmental considerations, consumers' decisions about electric vehicle adoption may also be affected by perceived risk. This concept refers to consumers' concerns regarding possible uncertainties associated with electric vehicle ownership, including battery performance, charging infrastructure, maintenance costs, safety issues, and long-term value (Shu et al., 2022; Vishwakarma, 2024). Previous studies have shown that perceived risk can influence consumer acceptance of electric vehicles; however, the strength and direction of this influence may differ depending on market conditions, consumer characteristics, and familiarity with EV technology (Yang et al., 2020; Gunawan et al., 2022). Therefore, further investigation is needed to understand the role of perceived risk in shaping consumer attitudes and purchase intentions, particularly within the Indonesian market.

In addition to personal perceptions, social factors also shape consumers' decisions about electric vehicle adoption. Subjective norm refers to an individual's perception of social expectations and opinions from important reference groups, such as family, friends, and communities (Ham et al., 2015; Ling et al., 2024). For products with high financial involvement, such as automobiles, support and recommendations from significant others may influence consumers' confidence and willingness to adopt new technologies. Previous research by Xu et al. (2025) has demonstrated that Subjective

norm plays an important role in shaping consumers' attitudes and purchase intentions toward electric vehicles.

Previous literature reveals three research gaps. First, an empirical gap remains because findings on the effects of environmental concern, perceived risk, subjective norm, and attitude on electric vehicle purchase intention are inconsistent. Second, a contextual gap exists because many studies were conducted in countries with different social, economic, and cultural conditions, limiting their applicability to Indonesian consumers, particularly in Jabodetabek. Third, a model gap arises from the limited integration of attitude as a mediator linking environmental, risk-related, and social factors to purchase intention. To address these gaps, this study develops a TPB model in which environmental concern, perceived risk, and subjective norm predict attitude, which in turn mediates the relationship with purchase intention as the dependent variable. Using PLS-SEM, the study examines both direct and indirect relationships to explain consumers' intention to purchase electric vehicles in Jabodetabek.

2. Literature Review and Hypothesis Development

2.1. The Effect on Attitude

Environmental concern refers to the extent to which individuals are aware of environmental problems and consider the environmental consequences of their consumption decisions (Zeng et al., 2023; Lopes et al., 2024). Consumers with stronger environmental awareness tend to consider sustainability alongside personal benefits when evaluating products. In the context of electric vehicles, greater environmental concern may lead to more favorable attitudes because EVs are perceived as a sustainable transportation option that can reduce carbon emissions and dependence on fossil fuels. Buhmann et al. (2024) found that environmental values influence consumers' perceptions and willingness to adopt battery electric vehicles. Similarly, Sudarsih et al. (2026) reported that environmental concern positively influences attitudes toward electric vehicles. Therefore, stronger environmental concern is expected to foster favorable attitudes toward EV adoption.

Besides environmental factors, consumers' attitudes toward electric vehicles may also be influenced by perceived risk, which refers to uncertainty and potential negative consequences associated with adopting a product or technology (Hidayah & Nuvriasari, 2026). In the EV context, perceived risk may involve battery reliability, charging infrastructure, driving range, maintenance costs, and uncertainty about long-term ownership value. Higher perceived risk may reduce consumer confidence and result in less favorable evaluations of EVs. Yang et al. (2020) found that perceived risk negatively affects consumers' attitudes toward EVs, while Gunawan et al. (2022) highlighted the influence of functional and financial risks on EV adoption. However, the effect may vary with consumers' knowledge, experience, and market development.

Consumers' attitudes toward electric vehicles are also influenced by subjective norm, which reflects perceived social expectations, acceptance, and encouragement from family, friends, and other important social groups. Xu et al. (2025) found that subjective norm plays an important role in shaping attitudes toward EV adoption, while Hu et al. (2025) highlighted how social expectations influence behavioral intentions toward new technologies. For high-involvement purchases such as automobiles, recommendations and support from the surrounding social environment may strengthen consumers' confidence and evaluations. Positive social influences can therefore encourage more favorable attitudes and strengthen consumers' intention to consider electric vehicles.

H1: Environmental concern has a positive effect on attitude.

H2: Perceived risk has a negative effect on attitude.
H3: Subjective norm has a positive effect on attitude.

2.2. The Effect on Purchase Intention

Purchase intention refers to consumers' willingness or likelihood to purchase a product in the future (Li et al., 2022; Duarte et al., 2024). Under the Theory of Planned Behavior, behavioral intention is shaped by individual evaluations, with Attitude serving as a key determinant (Ajzen, 1991). In the EV context, attitude reflects consumers' overall evaluation of EVs based on their perceived benefits, usefulness, suitability, and value relative to conventional vehicles. Favorable attitudes are associated with stronger purchase intentions, as Yang et al. (2020) and Meliana and Pangaribuan (2024) support. Environmental concern may also encourage EV purchase intention because consumers with stronger environmental awareness tend to consider sustainability in purchasing decisions. Yeğin and Ikram (2022) found a positive relationship between environmental concern and purchase intention, while Sudarsih et al. (2026) emphasized environmental awareness as an important factor in encouraging EV adoption.

Perceived risk may negatively affect consumers' purchase intention by increasing uncertainty about product performance and potential losses (Zhu et al., 2009). Lu et al. (2022) and Tran and Nguyen (2022) found that perceived risk has a negative effect on purchase intention. In the EV context, concerns about safety, battery reliability, performance, and other potential losses may increase hesitation to adopt EVs (Vafaei-Zadeh et al., 2022). Conversely, subjective norm may strengthen purchase intention through social support, recommendations, and expectations from significant reference groups. This influence is particularly relevant to environmentally friendly technologies, where social approval can shape adoption decisions. Guo and You (2023) highlighted the role of social factors in sustainable technology adoption, while Xu et al. (2025) confirmed that subjective norm significantly influences EV adoption intention.

H4: Attitude has a positive effect on purchase intention.
H5: Environmental concern has a positive effect on purchase intention.
H6: Perceived risk has a negative effect on purchase intention.
H7: Subjective norm has a positive effect on purchase intention.

2.3. The Mediating Effect of Attitude

Attitude serves as an important psychological mechanism through which external factors influence consumers' behavioral intentions. Based on the Theory of Planned Behavior, behavioral intention develops through individuals' evaluation of beliefs, perceptions, and social influences (Ajzen, 1991). In electric vehicle adoption, environmental concern, perceived risk, and subjective norm may therefore influence purchase intention indirectly by shaping consumers' evaluations of EVs. Previous studies by Yang et al. (2020), Yeğin and Ikram (2022), and Meliana and Pangaribuan (2024) show that positive attitudes significantly contribute to EV purchase intention, supporting attitude's role as a link between external factors and behavioral intention.

Environmental concern may enhance purchase intention through attitude because environmentally conscious consumers are more likely to develop favorable evaluations of EVs, which can strengthen their adoption intention (Yeğin & Ikram, 2022; Sudarsih et al., 2026). Conversely, research by Yang et al. (2020), Gunawan et al. (2022), and Vafaei-Zadeh et al. (2022) suggests that perceived risk may weaken purchase intention by generating unfavorable evaluations related to safety, battery reliability, performance, and ownership costs. Meanwhile, subjective norm may indirectly strengthen purchase intention when social support, recommendations, and

expectations from significant others foster positive attitudes toward EV adoption (Xu et al., 2025; Hu et al., 2025). Thus, attitude is expected to mediate the relationships between these factors and purchase intention.

H8: Attitude mediates the relationship between environmental concern and purchase intention.
H9: Attitude mediates the relationship between perceived risk and purchase intention.
H10: Attitude mediates the relationship between subjective norm and purchase intention.

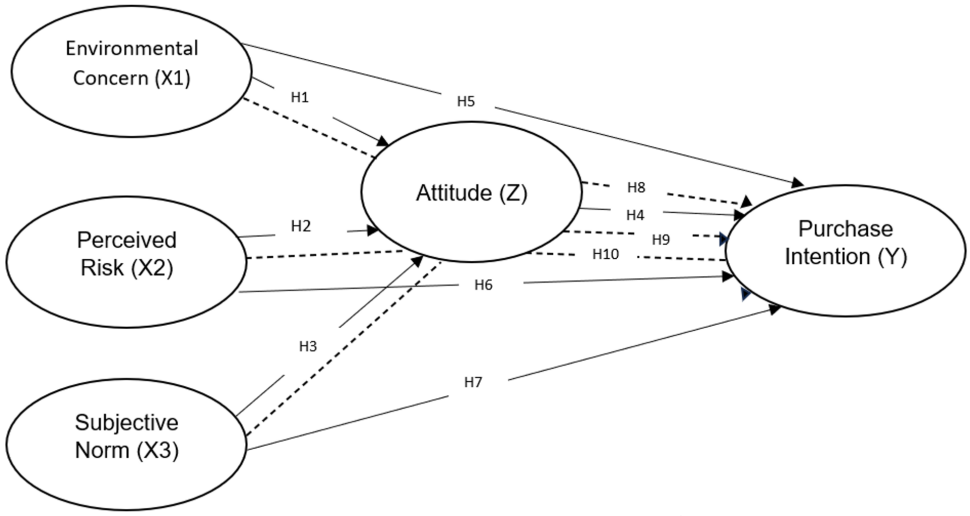


Figure 1. Research Framework

Figure 1 illustrates the proposed research framework examining the relationships among environmental concern, perceived risk, subjective norm, attitude, and purchase intention. The model proposes that environmental concern, perceived risk, and subjective norm directly influence attitude (H1, H2, H3). In addition, these three variables are expected to directly affect purchase intention (H5, H6, H7). Attitude is also expected to directly affect purchase intention (H4) and to mediate the indirect effects of environmental concern, perceived risk, and subjective norm on purchase intention (H8, H9, H10). The framework emphasizes that purchase intention is influenced not only directly by external and psychological consumer factors, but also indirectly through consumers' attitude toward the object under study.

3. Methods

This study employs a quantitative explanatory approach to examine factors affecting consumers' intention to purchase electric cars in the Jabodetabek area. The research model is grounded in the TPB introduced by Ajzen (1991), which explains behavioral intentions through individual beliefs, evaluations, and social influences. Accordingly, the study examines the effects of environmental concern, perceived risk, and subjective norm on consumers' attitude and purchase intention toward electric cars. The population comprises Jabodetabek residents who are aware of electric vehicle technology and potentially interested in purchasing an electric car. Using purposive sampling, 216 respondents were selected based on criteria requiring awareness of electric vehicle technology and consideration or intention to purchase an electric vehicle in the future.

Data were collected through a structured questionnaire measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The

measurement items were adapted from previous studies and modified to suit the context of electric vehicle adoption. The research framework includes environmental concern, perceived risk, and subjective norm as exogenous constructs, attitude as a mediating construct, and purchase intention as the endogenous construct. Environmental concern refers to consumers' awareness of environmental issues and their consideration of sustainability aspects in decision-making. Perceived risk represents consumers' perceptions regarding uncertainty and possible negative consequences related to electric vehicle adoption. Subjective norm describes the influence of expectations, opinions, and support from significant social groups. Meanwhile, attitude reflects consumers' overall evaluation of electric vehicles, while purchase intention represents their willingness and tendency to purchase electric vehicles in the future.

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. This method suits examining relationships among latent constructs in complex models, particularly when the research emphasizes prediction and theory development. The analysis assessed both the measurement (outer) and structural (inner) models. The measurement model was evaluated using convergent validity, discriminant validity, and construct reliability, based on outer loadings, Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach's Alpha (CA), cross-loadings, the Fornell-Larcker Criterion, and the Heterotrait-Monotrait Ratio (HTMT). The structural model was assessed using Variance Inflation Factor (VIF), R-square (R^2), and f-square (f^2) to evaluate multicollinearity, explanatory power, and effect sizes, respectively. Hypotheses were tested using bootstrapping based on path coefficients, t-statistics, and p-values. Mediation analysis further examined the indirect effect of environmental concern, perceived risk, and subjective norm on purchase intention through attitude.

Beyond examining the structural relationships, this study also conducted PLSpredict analysis to evaluate the proposed model's predictive capability based on out-of-sample performance. The assessment was performed using prediction error measures, including Root Mean Square Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and Q^2_predict values. Furthermore, Importance-Performance Map Analysis (IPMA) was conducted to provide practical implications by identifying constructs based on their level of importance and performance. The IPMA analysis was applied to the Attitude and Purchase Intention constructs to identify the factors that should receive greater attention to improve consumers' intention to adopt electric vehicles in the Jabodetabek area.

4. Results

Table 1 presents the demographic and relevant characteristics of the 216 respondents included in this study. The profile covers gender, age, occupation, monthly income, place of residence, conventional car ownership, and interest in purchasing an electric car, providing an overview of the respondents' backgrounds relevant to the research context.

Table 1. Respondent Characteristics

Variable	Category	Frequency	Percentage (%)
Gender	Female	125	57.87
	Male	91	42.13
Age	26 – 35 Years	116	53.70
	36 – 45 Years	50	23.15
	46 – 55 Years	41	18.98
	>56 Years	9	4.17
Occupation	Private Sector Employee	119	55.09
	Entrepreneur	59	27.31
	Civil Servant	38	17.59
Monthly Income	IDR 15,000,000 – IDR 20,000,000	102	47.22
	IDR 20,000,001 – IDR 25,000,000	55	25.46
	IDR 25,000,001 – IDR 30,000,000	27	12.50
	>IDR 30,000,001	32	14.81
Place of Residence	Jakarta	71	32.87
	Tangerang	53	24.54
	Bogor	37	17.13
	Depok	35	16.20
	Bekasi	20	9.26
Conventional Car Ownership	Yes	198	91.67
	No	18	8.33
Interest in Purchasing an Electric Car	Yes	216	100.00

Table 1 illustrates that the majority of respondents were female, accounting for 57.87% of the total sample, with most respondents falling within the age range of 26–35 years (53.70%). In terms of occupation, private-sector employees represented the largest group of respondents (55.09%). Furthermore, most respondents reported a monthly income between IDR 15,000,000 and IDR 20,000,000 (47.22%). In terms of residential distribution, Jakarta had the highest proportion of respondents at 32.87%. Additionally, 91.67% of respondents indicated that they already owned conventional vehicles, while all respondents expressed an intention to purchase electric cars.

Table 2. Validity and Reliability Test

Variable	Indicator	Outer Loading	AVE	CR	CA
Environmental Concern	EC1	0.847 – 0.855	0.725	0.840	0.620
	EC2				
Perceived Risk	PR1	0.830 – 0.913	0.761	0.864	0.693
	PR2				
Subjective Norm	SN1	0.814 – 0.845	0.695	0.872	0.781
	SN2				
	SN3				
Attitude	AT1	0.703 – 0.759	0.533	0.851	0.781
	AT2				
	AT3				
	AT4				
	AT5				
Purchase Intention	PI1	0.747 – 0.814	0.605	0.859	0.782
	PI2				
	PI3				
	PI4				

Based on Table 2, all constructs meet the criteria for convergent validity and composite reliability. Outer loading values range from 0.703 to 0.913, exceeding the 0.70 minimum threshold. AVE values range from 0.533 to 0.761, exceeding 0.50, while composite reliability values range from 0.840 to 0.872, indicating adequate internal consistency. Cronbach's Alpha values range from 0.620 to 0.782. Although environmental concern and perceived risk have Alpha values below 0.70, their composite reliability values exceed 0.70. Thus, the measurement model demonstrates acceptable convergent validity and composite reliability for further structural model analysis.

Table 3. Cross-Loading Results

Items	EC	PR	SN	AT	PI
EC1	0.855	0.082	0.143	0.339	0.278
EC2	0.847	-0.055	0.144	0.290	0.313
PR1	-0.076	0.830	0.117	0.054	0.077
PR2	0.081	0.913	0.108	0.092	0.089
SN1	0.100	0.105	0.842	0.511	0.519
SN2	0.121	0.090	0.845	0.535	0.482
SN3	0.199	0.124	0.814	0.567	0.473
AT1	0.382	0.100	0.496	0.759	0.559
AT2	0.284	0.051	0.527	0.750	0.553
AT3	0.249	-0.036	0.420	0.703	0.483
AT4	0.236	0.115	0.459	0.729	0.532
AT5	0.179	0.077	0.444	0.709	0.499
PI1	0.354	0.045	0.357	0.600	0.747
PI2	0.283	0.056	0.466	0.570	0.814
PI3	0.264	0.073	0.507	0.498	0.750
PI4	0.178	0.123	0.507	0.571	0.797

Note: EC= Environmental Concern, PR= Perceived Risk, SN= Subjective Norm, AT= Attitude, PI=Purchase Intention.

Based on Table 3, the cross-loading results indicate that all indicators have the highest loading values on their respective constructs compared with other constructs. EC ranges from 0.847 to 0.855, PR from 0.830 to 0.913, SN from 0.814 to 0.845, AT from 0.703 to 0.759, and PI from 0.747 to 0.814. These findings demonstrate that each indicator is more strongly associated with its intended construct than with other constructs. Therefore, the measurement model satisfies the cross-loading criterion for discriminant validity.

Table 4. Fornell-Larcker Criterion and HTMT Results

Test	Construct	AT	EC	PI	PR	SN
Fornell-Larcker Test	AT	0.730				
	EC	0.370	0.851			
	PI	0.721	0.347	0.778		
	PR	0.086	0.017	0.095	0.873	
	SN	0.645	0.169	0.590	0.128	0.834
HTMT	EC	0.523				
	PI	0.919	0.499			
	PR	0.148	0.182	0.129		
	SN	0.822	0.242	0.757	0.175	

Note: EC= Environmental Concern, PR= Perceived Risk, SN= Subjective Norm, AT= Attitude, PI=Purchase Intention.

Based on Table 4, the Fornell–Larcker criterion indicates that all constructs satisfy the discriminant validity requirement. The square roots of AVE for attitude (0.730), environmental concern (0.851), purchase intention (0.778), perceived risk

(0.873), and subjective norm (0.834) exceed their respective correlations with other constructs. However, the HTMT results range from 0.129 to 0.919. Most values are below the recommended threshold of 0.90, except for the relationship between attitude and purchase intention, which records the highest HTMT value of 0.919. This result indicates a potential discriminant validity issue between these two constructs. Therefore, although the Fornell–Larcker criterion is satisfied, the HTMT assessment does not fully support discriminant validity across all constructs. Further evaluation of the attitude and purchase intention indicators is recommended before concluding that the measurement model fully meets the discriminant validity requirements.

Based on Table 5, the collinearity assessment shows that the VIF values across the structural model range from 1.017 to 1.947. The highest VIF value is observed for the relationship between AT and PI, at 1.947, followed by the relationship between SN and PI, at 1.745. The VIF values for the relationships between EC and PI, EC and AT, SN and AT, and PR and both AT and PI are 1.170, 1.029, 1.046, and 1.017. Since all VIF values remain below the recommended threshold of 5.00, there is no indication of problematic multicollinearity among the predictor constructs. These results suggest that the structural model satisfies the collinearity criteria and is suitable for further analysis.

Table 5. VIF, Effect Size, and R-Square Test

Relationships	F-Square	VIF	R-Square		
			Variable	R-Square	Adjusted R Square
AT → PI	0.330	1.947	Attitude	0.486	0.479
EC → AT	0.137	1.029			
EC → PI	0.024	1.170			
PR → AT	0.000	1.017	Purchase Intention	0.557	0.549
PR → PI	0.001	1.017			
SN → AT	0.668	1.046			
SN → PI	0.065	1.745			

Note: EC= Environmental Concern, PR= Perceived Risk, SN= Subjective Norm, AT= Attitude, PI=Purchase Intention.

Based on Table 5, the f^2 results indicate that subjective norm has the largest effect size on attitude, at 0.668, followed by the effect of attitude on purchase intention, at 0.330. Environmental concern has an effect size of 0.137 on attitude, whereas its effect on purchase intention is smaller, at 0.024. Subjective norm has an effect size of 0.065 on purchase intention. Perceived risk demonstrates negligible effect sizes on both attitude and purchase intention, at 0.000 and 0.001. These findings indicate that subjective norm has the strongest effect on attitude, while attitude has a substantial effect on purchase intention.

The attitude construct records an R-Square value of 0.486 and an adjusted R-Square value of 0.479, showing that environmental concern, perceived risk, and subjective norm collectively explain 48.6% of the variance in consumers' attitudes toward electric cars. Meanwhile, purchase intention has an R-Square value of 0.557 and an adjusted R-Square value of 0.549, indicating that environmental concern, perceived risk, subjective norm, and attitude account for 55.7% of the variance in consumers' purchase intention. These findings indicate that both endogenous constructs have moderate explanatory power.

Table 6. Path Coefficient Results

Hypothesis	Path of Influence	Original Sample	T-Statistics	P-Values
H1	EC → AT	0.269	4.355	<0.001
H2	PR → AT	0.006	0.109	0.913
H3	SN → AT	0.599	12.399	<0.001
H4	AT → PI	0.534	7.183	<0.001
H5	EC → PI	0.112	1.772	0.077
H6	PR → PI	0.019	0.377	0.706
H7	SN → PI	0.224	2.921	0.004
H8	EC → AT → PI	0.143	3.693	<0.001
H9	PR → AT → PI	0.003	0.108	0.914
H10	SN → AT → PI	0.320	5.870	<0.001

Note: EC= Environmental Concern, PR= Perceived Risk, SN= Subjective Norm, AT= Attitude, PI=Purchase Intention.

Based on Table 6, environmental concern has a positive and significant effect on attitude ($\beta = 0.269$; $t = 4.355$; $p < 0.001$), as does subjective norm ($\beta = 0.599$; $t = 12.399$; $p < 0.001$). However, perceived risk does not significantly affect attitude ($\beta = 0.006$; $t = 0.109$; $p = 0.913$). Attitude positively and significantly influences purchase intention ($\beta = 0.534$; $t = 7.183$; $p < 0.001$), while subjective norm also has a significant direct effect on purchase intention ($\beta = 0.224$; $t = 2.921$; $p = 0.004$). Conversely, the direct effects of environmental concern ($\beta = 0.112$; $p = 0.077$) and perceived risk ($\beta = 0.019$; $p = 0.706$) on purchase intention are insignificant. Regarding indirect effects, attitude significantly mediates the relationships between environmental concern ($\beta = 0.143$; $p < 0.001$) and subjective norm ($\beta = 0.320$; $p < 0.001$) with purchase intention, but not perceived risk ($\beta = 0.003$; $p = 0.914$).

Table 7. PLS Prediction Results

Manifest Variable (MV)	RMSE	MAE	MAPE	Q^2_predict
AT1	0.766	0.600	18.040	0.309
AT2	0.844	0.648	22.925	0.302
AT3	0.924	0.689	26.866	0.190
AT4	0.853	0.658	21.307	0.217
AT5	0.929	0.693	25.003	0.187
PI1	0.900	0.710	23.775	0.174
PI2	0.956	0.724	27.021	0.238
PI3	0.880	0.675	24.612	0.270
PI4	0.959	0.739	27.142	0.237

Note: AT= Attitude, PI=Purchase Intention

The PLSpredict analysis presented in Table 7 shows that all indicators of the endogenous constructs, namely attitude and purchase intention, obtain positive Q^2_predict values ranging from 0.174 to 0.309. These results indicate that the proposed model demonstrates predictive relevance and can predict the observed indicators. In addition, the RMSE, MAE, and MAPE values describe the prediction error levels for each indicator, where lower error values represent better predictive performance. The findings confirm that the structural model provides sufficient out-of-sample predictive capability in explaining consumers' purchase intention toward electric cars.

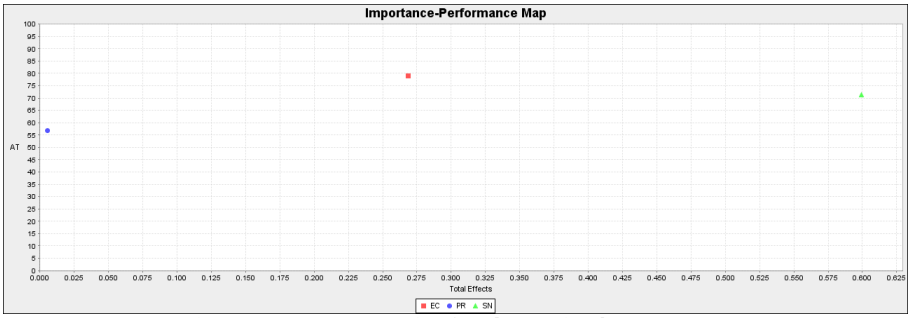


Figure 2. IPMA results for the Attitude Construct

Table 8. IPMA Results for Attitude

Construct	Importance (Total Effect)	Performance
Environmental Concern (EC)	0.269	79.115
Perceived Risk (PR)	0.006	57.772
Subjective Norm (SN)	0.599	71.281

The IPMA results in Table 8 and Figure 2 show that subjective norm has the highest importance value (0.599) in determining consumers' attitude toward electric cars, followed by environmental concern (0.269) and perceived risk (0.006). In terms of performance, environmental concern achieves the highest score of 79.115, indicating that respondents demonstrate a strong level of environmental awareness. Subjective norm has a performance value of 71.281, showing that social influence contributes considerably to the development of consumers' attitudes toward electric cars. Meanwhile, perceived risk records the lowest importance value (0.006) with a performance score of 57.772, suggesting that risk perceptions related to electric cars have a limited role in shaping consumers' attitudes. The IPMA findings indicate that strengthening social influence and increasing positive social acceptance of electric cars should be prioritized to improve consumers' attitudes toward EV adoption.

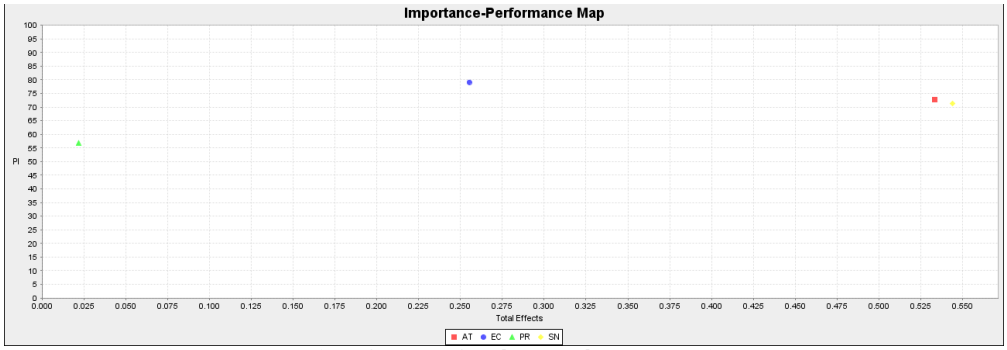


Figure 3. Results of IPMA for the Purchase Intention Construct

Table 9. IPMA Results for the Purchase Intention Construct

Construct	Importance (Total Effect)	Performance
Attitude (AT)	0.533	72.687
Environmental Concern (EC)	0.255	79.115
Perceived Risk (PR)	0.022	56.772
Subjective Norm (SN)	0.544	71.281

The IPMA results for the purchase intention construct presented in Table 9 and Figure 3 show that subjective norm has the highest importance value (0.544), followed by attitude (0.533) and environmental concern (0.255). These findings indicate that social influence and consumers' evaluations of electric cars are the main factors shaping purchase intention. Regarding performance, environmental concern

obtains the highest score of 79.115, reflecting that respondents demonstrate a strong level of environmental awareness. Attitude and subjective norm record performance values of 72.687 and 71.281, respectively, indicating that both factors perform relatively well in influencing consumers' purchase intention. Meanwhile, perceived risk has the lowest importance value (0.022) and a performance score of 56.772, suggesting that risk perceptions associated with electric cars contribute little to purchase intention. The IPMA results emphasize that improving consumers' positive attitudes and strengthening social influence are key factors that should be prioritized to encourage electric vehicle purchase intention.

5. Discussion

The results indicate that environmental concern positively and significantly affects attitude ($\beta = 0.269$; $p = 0.000$). This finding demonstrates that consumers with greater awareness of environmental issues tend to develop more positive perceptions of electric cars. Consumers who value sustainability are more likely to view EVs as an environmentally friendly transportation alternative because they can help reduce carbon emissions. This result is consistent with Sudarsih et al. (2026), who identified environmental concern as an important factor influencing consumers' attitudes toward electric vehicles. Moreover, Buhmann et al. (2024) emphasized that environmental values play a significant role in shaping consumers' evaluations of battery electric vehicles. In addition, subjective norm has the strongest influence on attitude. This result highlights that social factors, such as opinions, recommendations, and support from family members, friends, and communities, have an important role in shaping consumers' perceptions of electric cars. This finding supports Xu et al. (2025) and is consistent with Ajzen's Theory of Planned Behavior, which explains that social expectations and external influences can affect individual attitudes and behavioral evaluations.

However, perceived risk does not significantly influence attitude, suggesting that concerns about battery reliability, charging infrastructure, maintenance costs, and ownership uncertainty are not the primary factors shaping consumers' EV attitudes in Jabodetabek. This finding contrasts with Yang et al. (2020) and Gunawan et al. (2022), who identified perceived risk as a significant factor in EV acceptance. The difference may reflect variations in consumer characteristics, market conditions, and familiarity with EV technology. In contrast, attitude has a positive and significant effect on purchase intention, indicating that favorable evaluations of EVs strengthen consumers' willingness to purchase. This finding is consistent with Yang et al. (2020), Yeğin and Ikram (2022), and Meliana and Pangaribuan (2024), who identified Attitude as an important determinant of EV purchase intention.

The direct effect analysis further reveals that environmental concern does not significantly influence purchase intention. Although environmental concern shows a positive relationship, it is not sufficient on its own to directly encourage consumers to purchase electric cars. Consumers may still consider other aspects, including economic considerations, practical benefits, and compatibility with their needs before making purchasing decisions (Vishwakarma, 2024). Similarly, perceived risk does not significantly affect purchase intention, indicating that perceived concerns about EV adoption play a limited role in determining purchase intention in this study. Conversely, subjective norm has a positive and significant direct effect on purchase intention, showing that social influence remains an important factor in encouraging consumers' intention to adopt electric vehicles (Senyapar et al., 2023).

The mediation analysis further explains how the independent variables influence purchase intention through attitude. Environmental concern demonstrates a significant indirect effect on purchase intention through attitude. This finding indicates that environmental awareness influences consumers' purchase intention by

first shaping positive attitudes toward electric vehicles, consistent with Yeğin and Ikram (2022) and Sudarsih et al. (2026), who highlighted the relationship between environmental concern, favorable EV evaluations, and adoption intention. Subjective norm also has a significant indirect effect through attitude, demonstrating that social influence affects purchase intention both directly and indirectly through consumers' attitudes, consistent with Xu et al. (2025) and Hu et al. (2025). Meanwhile, perceived risk does not show a significant indirect effect through attitude, suggesting that perceived risk does not substantially contribute to explaining consumers' intention to purchase electric vehicles in the Jabodetabek context.

PLSpredict results indicate adequate predictive capability, with positive Q^2_predict values for Attitude and Purchase Intention ranging from 0.174 to 0.309. The RMSE, MAE, and MAPE values also indicate acceptable prediction errors, supporting the model's out-of-sample predictive performance. IPMA results show that subjective norm has the highest importance for attitude (0.599), followed by environmental concern (0.269) and perceived risk (0.006), while environmental concern records the highest performance (79.115). For purchase intention, subjective norm (0.544) and attitude (0.533) are the most important factors, reinforcing the TPB perspective that social influence and individual evaluations contribute to behavioral intention (Ajzen, 1991). These findings suggest that EV manufacturers, marketers, and policymakers should strengthen positive attitudes and social acceptance through educational programs, EV-user testimonials, and community-based initiatives to encourage EV adoption in Jabodetabek.

6. Conclusion

This study investigates the determinants of consumers' purchase intention toward electric cars in the Jabodetabek area by examining environmental concern, perceived risk, and subjective norm, with attitude as a mediating variable. The findings indicate that environmental concern and subjective norm significantly influence attitude, whereas perceived risk does not. Attitude has a positive and significant effect on purchase intention, while subjective norm also has a significant direct effect. In contrast, environmental concern and perceived risk do not directly influence purchase intention. The mediation analysis further shows that attitude mediates the relationships between environmental concern and purchase intention and between subjective norm and purchase intention, but not between perceived risk and purchase intention. Moreover, positive Q^2_predict values ranging from 0.174 to 0.309 indicate the proposed model's adequate predictive capability.

The findings provide practical implications for electric vehicle manufacturers, marketers, and policymakers. The IPMA results identify subjective norm as the most influential factor in shaping both attitude and purchase intention, while attitude also plays an important role in consumers' purchase decisions. Therefore, strategies should strengthen positive consumer perceptions and social acceptance through educational campaigns, testimonials from EV users, community engagement, and communication emphasizing the environmental and practical benefits of electric vehicles. This study is limited by purposive sampling and the concentration of respondents in the Jabodetabek area, which may limit the generalizability of the findings to other regions. Future research should use broader, more diverse samples and incorporate additional factors, such as perceived usefulness, price perception, government incentives, charging infrastructure availability, technological knowledge, and trust, to provide a more comprehensive understanding of electric vehicle adoption.

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